

Amendments to the Specification:

Please replace paragraph [0020] with the following rewritten paragraph:

[0020] This ~~vehicle~~vehicle 5 is a so-called electric car including a motor 10 as a driving source. The motor 10 is a three-phase alternating-current (AC) motor, and includes stators (not shown) around which coils 11, 12, and 13 are wound. The coils 11, 12, and 13 supply the three phases of the motor, i.e. a U phase, a V phase, and a W phase, with alternating currents. The coils 11, 12, and 13 are connected to an inverter circuit 21. The inverter circuit 21 converts a direct-current (DC) voltage supplied by a battery 22 functioning as a DC power source into an AC voltage, and sequentially supplies the AC voltage to the coils 11, 12, and 13 of the U phase, the V phase, and the W phase, respectively. The motor 10 is driven by the supply of the AC voltage to the phases.

Please replace paragraph [0023] with the following rewritten paragraph:

[0023] As shown in Fig. 1, a rotation sensor 31 for detecting the rotational angle of the motor 10 and an accelerator-aperture sensor 32 for detecting the aperture of an accelerator (not shown) of the ~~vehicle~~vehicle 5 are connected to the control device 30. The rotation sensor 31 sends the detected rotational angle of the motor 10 to the control device 30, and the control device 30 calculates the number of revolutions of the motor 10 based on the rotational angle. The accelerator-aperture sensor 32 sends the detected accelerator aperture to the control device 30, and the control device 30 determines an indicative torque Ta in the motor 10 based on the rotational angle of the motor 10 and the accelerator aperture. The control device 30 sends the indicative torque Ta to the inverter circuit 21, and the inverter circuit 21 supplies the motor 10 with an alternating current depending on the indicative torque Ta.

Please replace paragraph [0025] with the following rewritten paragraph:

[0025] In the process, one of the temperatures of the three phases is selected based on the detected phase of the currents in the motor 10. When the ~~vehicle~~vehicle 5 is detected to be in a stalled state, and when the temperature of the selected phase exceeds a restrictive temperature, the torque of the motor 10 is reduced. The ROM stores the program, curves (computing equations, maps) illustrating the correlation between the amplitude and the phase θ of the currents in the motor 10 shown in Fig. 4, a map illustrating the relationship between a torque-restricting rate and a coil temperature of each phase of the motor 10 shown in Fig. 5, and a map illustrating the relationship between a maximum torque and the number of

revolutions of the motor 10 shown in Fig. 6. The RAM temporarily stores the computed values relating to the control.

Please replace paragraph [0026] with the following rewritten paragraph:

[0026] Next, operations of the control device of the vehicle motor having the above-described structure will now be described with reference to flow charts shown in Figs. 2 and 3. While an ignition switch (not shown) of the ~~vehicle~~ vehicle 5 is on, the control device 30 executes the programs corresponding to the flow charts every predetermined short period. The control device 30 calculates an indicative torque T^* (Step 102) based on the input accelerator aperture and the calculated number of revolutions of the motor 10 at a start of the program in Step 100 shown in Fig. 2.

Please replace paragraph [0027] with the following rewritten paragraph:

[0027] Then, the control device 30 detects whether the ~~vehicle~~ vehicle 5 is stalled (Step 104). When the (1) absolute value $|N|$, indicative of the number of revolutions N of the motor calculated based on the input rotational angle, is less than or equal to a predetermined value N_0 (for example, 100 rpm), and when the (2) absolute value $|T^*|$ of the indicative torque T^* , calculated based on the input accelerator aperture and the calculated number of revolutions N of the motor 10, is more than or equal to a predetermined value T_n , the control device 30 determines that the ~~vehicle~~ vehicle 5 is stalled. Otherwise the ~~vehicle~~ vehicle 5 is not stalled.

Please replace paragraph [0028] with the following rewritten paragraph:

[0028] When the ~~vehicle~~ vehicle 5 is not stalled, the control device 30 determines "NO" in Step 104, and then outputs the indicative torque T^* calculated in Step 102 to the inverter circuit 21 so as to control the motor 10 at a torque depending on the indicative torque T^* in Step 106. That is to say, the control device 30 conducts an ordinary torque control. Subsequently, the program proceeds to Step 108 so as to end temporarily.

Please replace paragraph [0029] with the following rewritten paragraph:

[0029] Next, when the ~~vehicle~~ vehicle 5 is detected to be in the stalled state, the control device 30 determines "YES" in Step 104, and selects a phase whose temperature is to be measured based on the phase θ of the currents in the motor 10 in Step 110. That is to say, the control device 30 executes a subroutine shown in Fig. 3.

Please replace paragraph [0033] with the following rewritten paragraph:

[0033] On the contrary, when the temperature T is more than or equal to the restrictive temperature T_s , the control device 30 calculates a reduced indicative torque for

setting a torque lower than that of the ordinary control conducted until immediately before, and outputs the calculated indicative torque to the inverter circuit 21 so as to control the motor 10 at a torque depending on the reduced indicative torque (Steps 114 to 118, 106). That is to say, the control device 30 reduces the torque. In detail, the control device 30 calculates the torque-restricting rate η (%) as described above (Step 114), and compares the restrictive torque with the indicative torque T^* (Step 116). When the indicative torque T^* exceeds the restrictive torque, the control device 30 sets the restrictive torque as a new indicative torque T^* (Step 118). In both cases, the program proceeds to Step 108 so as to end temporarily. A reduced indicative torque T_b is preferably set such that the vehicle 5 gradually moves back.

Please replace paragraph [0034] with the following rewritten paragraph:

[0034] Next, operations of a vehicle 5 including the control device operating as above will now be described with reference to Fig. 7. Fig. 7 is a time chart illustrating the temperatures of the three phases in the motor 10, the temperature of the selected phase, and the position of the vehicle 5, respectively, from top to bottom.

Please replace paragraph [0035] with the following rewritten paragraph:

[0035] When the vehicle 5 on a hill is stalled at time t_0 due to a balance between a backward movement by the weight of the vehicle 5 and a forward movement by the torque of the motor 10, a phase whose temperature is to be detected is selected (Steps 102, 110). In the example shown in Fig. 7, the phase θ of the currents in the stalled motor 10 ranges within $-\theta_1 \leq \theta \leq \theta_1$. Accordingly, the U phase is selected for the temperature detection. Immediately after the motor is stalled, the U-phase temperature is considerably lower than the restrictive temperature T_s . The vehicle 5 remains halted at a stopping position A until the U-phase temperature exceeds the restrictive temperature T_s . Since the motor 10 is stalled while the phase θ ranges within $-\theta_1 \leq \theta \leq \theta_1$ after time t_0 , most of the current flows in the U phase, and the U-phase temperature rises at a faster rate than those of the other phases.

Please replace paragraph [0036] with the following rewritten paragraph:

[0036] When the U-phase temperature exceeds the restrictive temperature T_s at time t_1 , the control device 30 calculates an indicative torque lower than that up to time t_1 (Step 116), and controls the motor 10 at the indicative torque (Step 106). Consequently, the torque of the motor 10 is reduced, and the vehicle 5, which was halted up to time t_1 due to

the balance, moves backward. As a result, the ~~vehicle~~vehicle 5 is released from the stalled state and determined as unstalled, and an ordinary torque control is conducted (Steps 102, 104). Accordingly, the ~~vehicle~~vehicle 5 gradually stops the backward movement when the phase in which the current flows changes, is re-stalled at time t2, and stops at a stopping position B.

Please replace paragraph [0037] with the following rewritten paragraph:

[0037] At time t2, the control device 30 determines that the ~~vehicle~~vehicle 5 is stalled as in the case of time t0, and selects a phase whose temperature is to be detected (Steps 102, 110). During a period from time t1 to time t2, the phase θ advances by substantially 60° due to a slight backward movement of the ~~vehicle~~vehicle 5, and the ~~vehicle~~vehicle 5 stops in this state. Accordingly, the phase θ ranges within $60^\circ - \theta_1 \leq \theta \leq 60^\circ + \theta_1$, and thus the W phase is selected for the temperature detection. At time t2, the W-phase temperature is higher than that at the start of the stalled state (time t0). However, the W-phase temperature is the lowest of those of the three phases, and is lower than the restrictive temperature T_s . Therefore, the ~~vehicle~~vehicle 5 remains halted at the stopping position B until the W-phase temperature exceeds the restrictive temperature T_s . Since the motor 10 is stalled while the phase θ ranges within $60^\circ - \theta_1 \leq \theta \leq 60^\circ + \theta_1$ after time t2, most of the current flows in the W phase, and the W-phase temperature rises at a faster rate than those of the other phases.

Please replace paragraph [0038] with the following rewritten paragraph:

[0038] When the W-phase temperature exceeds the restrictive temperature T_s at time t3, the control device 30 reduces the torque of the motor 10 as in the case of time t1. Thus, the ~~vehicle~~vehicle 5, which was halted up to time t3 due to the balance, moves backward. Subsequently, the ordinary torque control is conducted to the ~~vehicle~~vehicle 5, the ~~vehicle~~vehicle 5 is re-stalled at time t4, and stops at a stopping position C.

Please replace paragraph [0039] with the following rewritten paragraph:

[0039] At time t4, the control device 30 determines that the ~~vehicle~~vehicle 5 is stalled as in the case of time t0, and selects a phase whose temperature is to be detected (Steps 102, 110). During a period from time t3 to time t4, the phase θ advances by substantially 60° due to a slight backward movement of the ~~vehicle~~vehicle 5, and the ~~vehicle~~vehicle 5 stops in this state. Accordingly, the phase θ ranges within $120^\circ - \theta_1 \leq \theta \leq 120^\circ + \theta_1$, and thus the V phase is selected for the temperature detection. At time t4, the V-phase temperature is higher than that at the start of the stalled state (time t0). However, the V-phase temperature is lower than

the restrictive temperature T_s . Therefore, the ~~vehicle~~vehicle 5 remains halted at the stopping position C until the V-phase temperature exceeds the restrictive temperature T_s . Since the motor 10 is stalled while the phase θ ranges within $120^\circ - \theta_1 \leq \theta \leq 120^\circ + \theta_1$ after time t_4 , most of the current flows in the V phase, and the V-phase temperature rises at a faster rate than those of the other phases.

Please replace paragraph [0040] with the following rewritten paragraph:

[0040] When the V-phase temperature exceeds the restrictive temperature T_s at time t_5 , the control device 30 reduces the torque of the motor 10 as in the case of time t_1 . Thus, the ~~vehicle~~vehicle 5, which was halted up to time t_5 due to the balance, moves backward.

Please replace paragraph [0041] with the following rewritten paragraph:

[0041] The above-described process is repeated until all the phase temperatures exceed the restrictive temperature T_s . When all the phase temperatures exceed the restrictive temperature T_s , the torque-reducing control is continuously conducted, and thus the ~~vehicle~~vehicle 5 continues moving backward.

Please replace paragraph [0042] with the following rewritten paragraph:

[0042] As described above, when a temperature of a phase in a stalled ~~vehicle~~vehicle 5 reaches the restrictive temperature T_s , the ~~vehicle~~vehicle 5 moves backward due to the reduced torque, and the phase θ is shifted. When the ~~vehicle~~vehicle 5 is re-stalled, a phase whose temperature does not reach the restrictive temperature T_s can be used until all the phase temperatures exceed the restrictive temperature T_s .

Please replace paragraph [0044] with the following rewritten paragraph:

[0044] As is clear from the above-described description, according to this embodiment, when a temperature of a phase in a ~~vehicle~~vehicle 5 stalled on a hill reaches the restrictive temperature T_s , the torque is reduced and the ~~vehicle~~vehicle 5 moves slightly backward. Then, the phase in which the current flows changes and the ~~vehicle~~vehicle 5 is re-stalled. At this time, when the temperature of the particular phase selected according to the phase θ in the motor 10 in this state does not reach the restrictive temperature T_s , the control device 30 compares the phase temperature and the restrictive temperature T_s . Whereas the phase temperature reaches the restrictive temperature T_s , the control device 30 repeats the torque-reducing process until the motor 10 stops at a phase temperature less than the restrictive temperature T_s . Thus, compared with the known technologies in which a time period before a torque-reducing control starts in one of the phases is short, gradability of the

~~vehicle~~vehicle 5 is ensured for a long period of time before the torque-reducing control starts in all the phases. Therefore, a driving performance and a driving feel of the stalled ~~vehicle~~vehicle 5 can be improved.